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Examining the Built Environment as a Contextual Factor to Family Engagement in the NICU

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EXAMINING THE BUILT ENVIRONMENT AS A CONTEXTUAL FACTOR TO FAMILY ENGAGEMENT IN THE NICU

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BACKGROUND

Parents contribute to the development of infants being treated at the Neonatal Intensive Care Unit (NICU), improving infant development, reducing NICU length of stay, and minimizing potential hospital readmissions (Fenwick et al., 2008).

Family engagement is critical to maximize family participation in care (Carman et al., 2013), and in the NICU parents experience family engagement while preparing for their role after NICU discharge, through various actions and interactions (Altimier et al., 2005; Örtenstrand et al., 2010).

The Single Family Room (SFR) design model is the current trend in NICUs, showing increased privacy and parental participation in care when compared to the previous model (open bay) (Shepley, 2014). However, the SFR design shows **concerns related to peer-to-peer isolation** (Shepley et al., 2008; Cone et al., 2010; Bosch et al., 2012) and **is still unexplored in-depth as to its impact on family engagement**.

AIM

Explore how various types of built environment characteristics may support, facilitate or hinder actions and interactions related to family engagement in the NICU.

CONTRIBUTIONS

Facilitate the family engagement process in the NICU, for both parents and staff.

Inform the design of single family room NICUs, the current trend in NICU design.

Inform future research with a foundational conceptual framework and methodological approach that can evolve and adapt to other types of healthcare settings.

LITERATURE REVIEW

FAMILY ENGAGEMENT: ACTIONS & INTERACTIONS

Being present: the frequency and duration of parents' visits to their infants has been associated to how much they participate in interactions like breastfeeding and medical rounds (Franck & Spencer, 2003; Davidson, 2013).

Receiving care: parents' phisiological and psychological wellbeing are important conditions for them to interact (Verhaeghe et al., 2005; Garrouste-Orgeas et al., 2010). Previous studies have found that access to information, social support and daily living activities mitigate parents' stress in the NICU (Cleveland, 2008, Mundy, 2010).

Receiving and providing information: interactions between parents and staff are critical to their effective communication as well as for parents' learning in the NICU, which often occurs through medical rounds and infant care training and coaching (Davidson, 2013; Reeves et al., 2015; Cooper et al., 2007)

Providing care: participation in infant care is when parents are most active in the engagement process, occurring through hand-on parental contributions to care like infant feeding and cleaning (Griffin, 2006; Skene et al., 2012)

BUILT ENVIRONMENT: GLOBAL, RELATIONAL & LOCAL CHARACTERISTICS

Overall layout of spaces in the unit, like infant rooms, staff workstations and corridors, may create different conditions of physical proximity and visibility between people in the unit, thus affecting differently their movement and interactions (Cai & Zimring, 2011; Lu, 2010; Domanico et al., 2010; Shepley et al., 2008)

Physical proximity and visibility between spaces reinforce communication patterns through movement and interactions in healthcare settings, office settings and educational settings (Cai & Zimring, 2011; Serrato & Wineman, 1999)

Physical characteristics within spaces like their size, shape and boundaries can be barriers to physical proximity and visibility, hindering interactions (Walsh et al., 2006; Hadi & Zimring, 2016). Light, noise, personal space (e.g. bedside furniture), social support oriented space types and seating layouts, and positive distractions (e.g. access to nature, artwork, views) may also affect perceptions of satisfaction and social support in the NICU (Andrade & Devlin, 2015; Shepley et al., 2008; Heermann et al., 2005; Ulrich, 1991).

RESEARCH QUESTIONS

- **RQ 1** How is the built environment being used to support family engagement interactions in SFR NICUs?
- **RQ 2** How do layout types based on the distribution of single family rooms, staff workstations and corridors facilitate or hinder family engagement interactions in SFR NICUs?
- **RQ 3** How does the visibility and the physical proximity between spaces facilitate or hinder family engagement interactions in SFR NICUs?
- **RQ 4** How do physical characteristics within spaces facilitate or hinder family engagement interactions in SFR NICUs?

METHODOLOGY

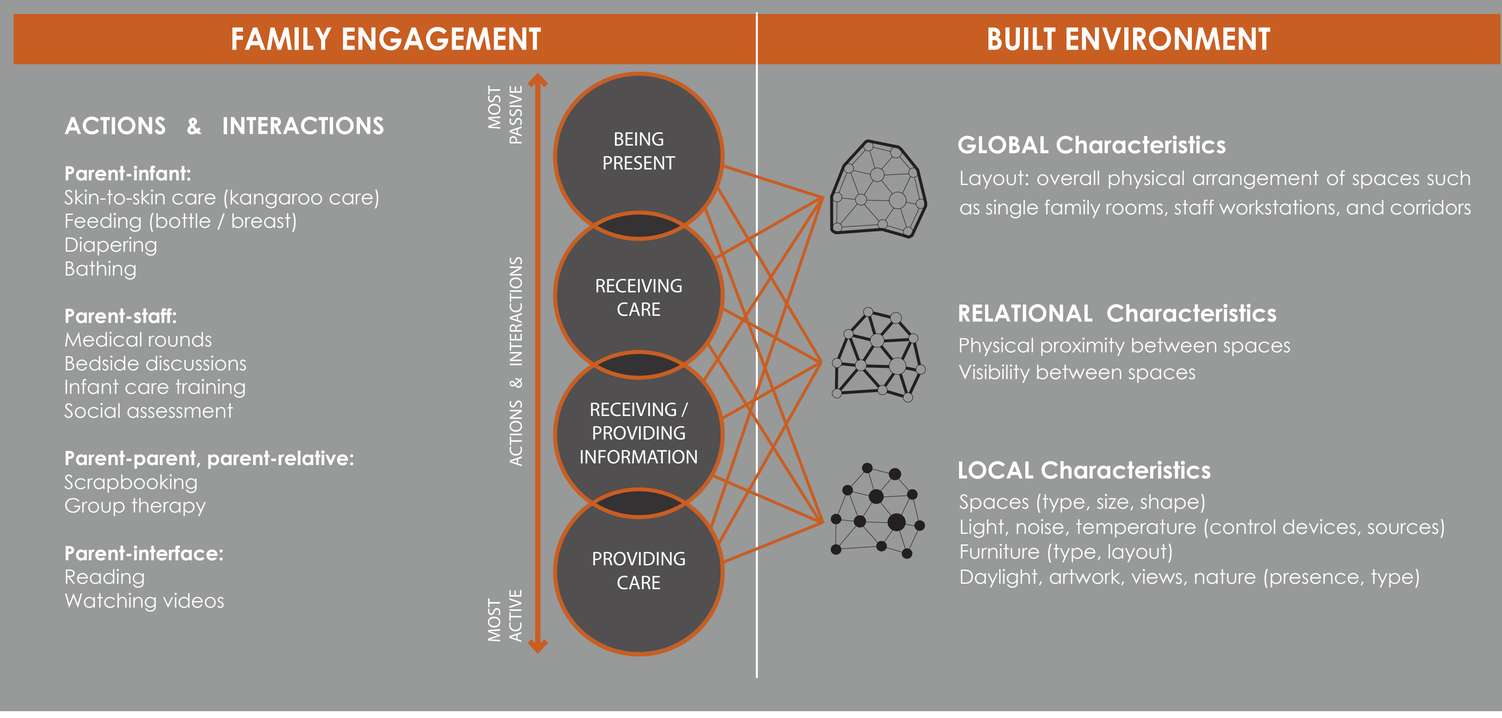
QUALITATIVE, GROUND-UP THEORY BUILDING APPROACH

Case Study Research Design:
Case representative of the SFR design model, with various family support rooms, and offering various family engagement actions and interactions.

Data Collection:
Physical assessment (checklist, floorplans, photos), in-depth observations (participant and non-participant), interviews with parents and staff, survey with parents.

Data Anlysis:
Grounded theory approach, pattern matching, cross-case synthesis

CONCEPTUAL FRAMEWORK



DESCRIPTIVE INSIGHTS (Pilot Study)

ORGANIZATIONAL CULTURE

Parents experience multiple rooms in the unit:
- First parents experience the open bay alcove (high acuity),
- After infants improve, parents esperience the shared family room (midium acuity),
- Parents experience the single family room last (low acuity).

Family lounge is intended for open bay parents.
Staff traffic is more intense in Neighborhood 1.

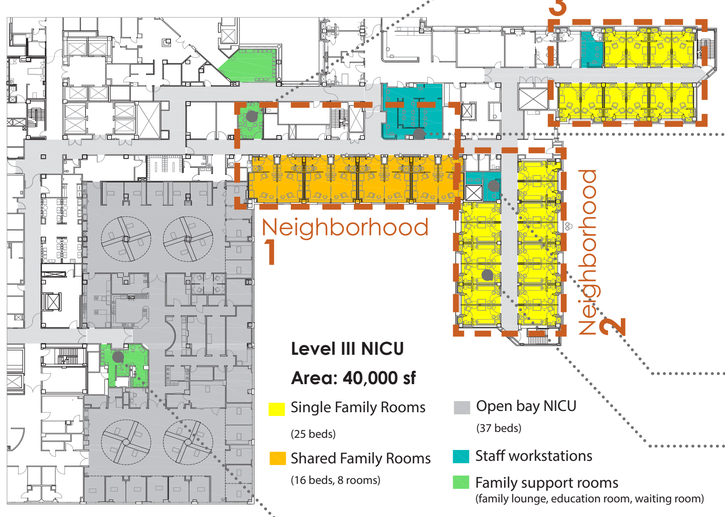
SETTING

Pinwheel corridor layout

3 neighborhoods of family rooms

Centralized staff workstations in each neighborhood

Family support rooms mostly outside the NICU



ACTIONS/INTERACTIONS	SPACES USED	PEOPLE INVOLVED	PHYSICAL ELEMENTS INVOLVED
Parents' daily living actions	SFR, Family Lounge, Cafeteria (outside NICU), Corridor (water cooler)	Parents	Sofa-bed, storage, breast milk pumping machine, phone, mini refrigerator, TV
Parents' social support interactions	SFR, Corridor	Parents, grandparents, nurses, physicians	Seating area
	Waiting room	Parents, relatives/friends	Seating area
Medical rounds	SFR, Corridor	Parents, Infant, physicians, nurses	Mobile workstation
Parents' Infant care training (discharge classes)	SFR	Parents, infant, bedside nurse	Sink, supply cabinet
		Parents, occupational/respiratory therapist,	
	Conference room	Parents, class instructor, social support specialist	Table, chairs, mobile workstation, dolls
Parents providing care	SFR	Parent, grandparent, bedside nurse	Supply cabinet, incubator, reclining chair
Parents' supportive care (assisting bedside nurses)	SFR, workstation	Parent, bedside nurse	Supply cabinet

EMERGING THEMES (Pilot Study)

BUILT ENVIRONMENT CHARACTERISTICS INFLUENCING 'RECEIVING CARE'

Visibility between SFR and staff workstations supporting parents' sense of security:
Being able to see the workstation from the SFR reassures parents that their infants are receiving proper staff supervision.

SFR seating and storage supporting social support interactions:
Seating areas free of clutter support interactions in which staff purposefuly talks to parents at eye level (e.g. social assessments), suggesting the need for storage cabinets to keep parents' personal items from cluttering seating areas.

Type of window views in the SFR supporting parents' mental health:
Looking at other buildings from the SFR window may intensify feelings of depression on parents prone to depression.

Type of artwork in the SFR supporting parents' sense of ownership towards infant:
The display of artwork on SFR walls supports milestone celebrations (e.g. infant's first breastfeeding) which contribute to parents' sense of ownership towards their infant.

BUILT ENVIRONMENT CHARACTERISTICS INFLUENCING 'RECEIVING AND PROVIDING INFORMATION'

Room shape and layout supporting parent-staff visibility and communication:
Room depth in relation to corridors combined with the location of parents' chairs in the room may influence staff's ability to see if parents are in the room and available for unplanned bedside discussions.

Room size and layout supporting teaching:
Discharge classes support multiple types of activities, such as interactive lectures, infant care simulations with dolls, watching infant care videos, and eating, suggesting the need for adequate space for storage and circulation in NICU classrooms.

BUILT ENVIRONMENT CHARACTERISTICS INFLUENCING 'PROVIDING CARE'

Physical proximity between SFR and amenities supporting parent-infant interactions:
The location of coffee and vending machines may reduce the time parents have to spend away from their infants (SFR).

Isolet position supporting infant care (parent-infant and parent-staff):
The position of the isolet in relation to the headwall affects the interaction between parent and staff during infant care, as well as parents' ability to interact with the infant (e.g. left handed vs. right handed parents).

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